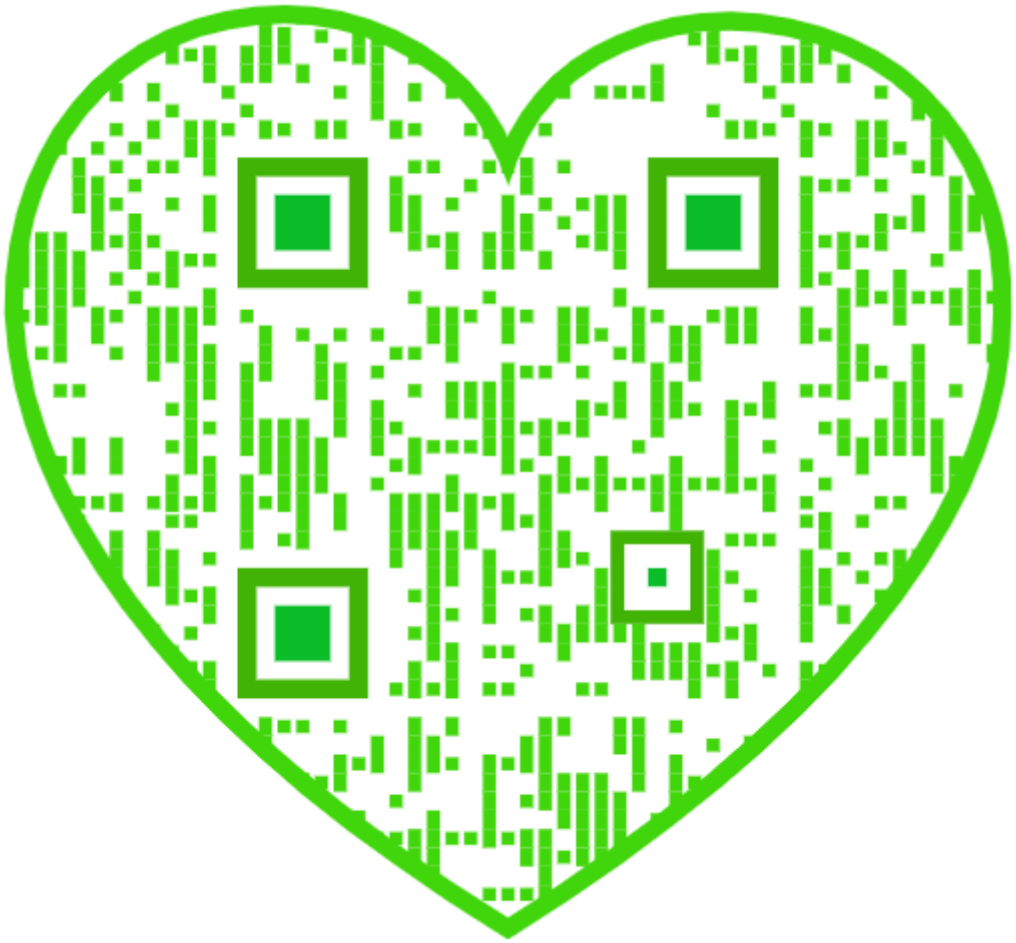

A CHAPTER

IN

MINOR SURGERY.

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BY

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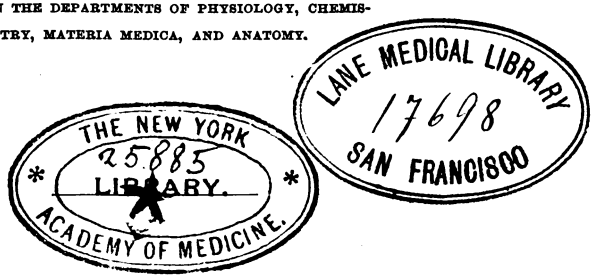

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PREFACE.

THIS "Chapter in Minor Surgery," includes the introductory pages of a work on Minor Surgery, upon which the author has been engaged for several years.

When completed, that volume is intended to be an instructor to the young surgeon, teaching by most minute and exact explanations how to become practically acquainted with the application and management of the various surgical apparatus.

From the countless host of appliances in surgery, he has attempted to select those which his own experience and that of his friends among the older and more eminent members of the profession can recommend as most useful.

It has been his earnest endeavor, as a teacher in surgery, to impress upon his students the fact that it would be through a practical knowledge of the *little things* of their profession that they would soonest reach the great result—success.

The fact that he has been constrained to offer these pages in an unfinished form, in response to a demand from a large number of private students, has encouraged him to believe his efforts have not been fruitless.

This book will not be completed until the principal

hospitals of Europe have been visited, with the special aim of studying and introducing in its pages the most recent improvements and ideas in the department of which it treats.

In conclusion, acknowledgment is made for some valuable suggestions in this pamphlet from Hamilton's Surgery, from which one cut is taken, and from Berkley Hill's Essentials of Bandaging, from which two engravings are borrowed.

The remaining illustrations were made from sketches from life by the author and Mr. Wright, an artist of merit from this city.

226 FIFTH AVENUE, NEW YORK, November 15, 1875.

A CHAPTER

IN

MINOR SURGERY.

How to Make and Apply Bandages.

Bandages are made of common cotton cloth, called in the stores unbleached muslin, or domestic.

The most suitable length is twelve feet, and the piece of goods should be cut in pieces of this length, the outside edges torn off, and the cloth torn into strips of proper width. Any loose threads in the raveled edges should be carefully pulled out by hand, and the bandage can then be rolled, either by hand or machine, into a firm, smooth roller.

The most convenient width for the bandages, for all parts of the body (except the hand), is two and a half inches. The hand bandages should be between three-quarters and one inch in width.

Methods of Applying Bandages.

The various portions of the body may be bandaged by the (1) *simple spiral*, (2) *reverse*, (3) *figure of* 8 *turn*,

and it is best to become thoroughly acquainted with each of these methods, as all three may be required in bandaging a single extremity. The *simple spiral* turn is most useful in bandaging those parts of the body where there is no sudden increase in the diameter and volume of the part. It is impracticable under other circumstances.

Hold the bandage in the hand most convenient, with the back of the roller toward the limb (see Fig. 1); with

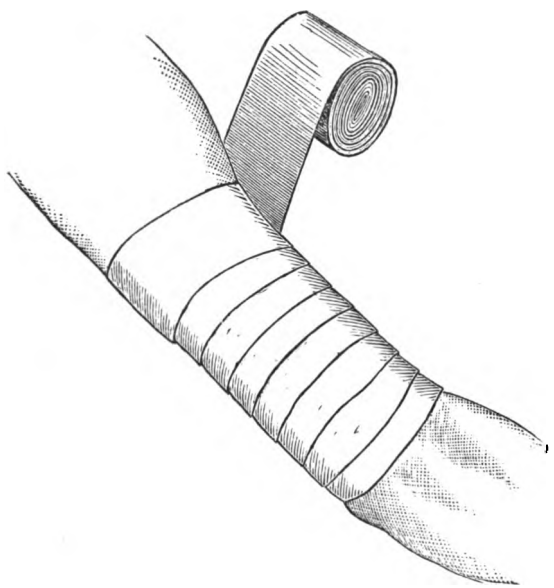

FIG. 1.—The simple spiral method.

the unoccupied hand take the free end of the bandage, lay and hold it upon the inner border of the limb, and

carry the turn by the front to the outer side of the part to be bandaged.

Having carried the roller twice around the part to secure it, ascend the limb spirally, leaving about one-third of each turn uncovered by the last.

The *reverse* turn (Fig. 2) is applied as follows:

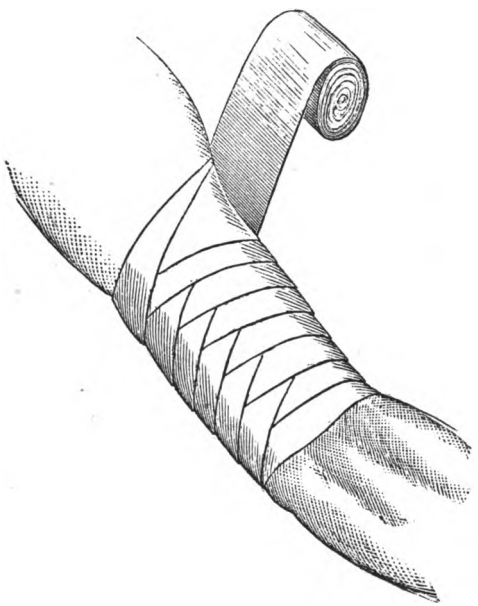

FIG. 2.—The reverse method.

Taking the left arm to be bandaged, hold the roller in the right hand, with its convexity toward the limb, and carry it from the inner or ulnar border, by the front, to the outer or radial border, and thus around the arm by two circular turns to secure the roller. Then having

carried the bandage to the outer side, ascending the limb gradually, lay the thumb of the left hand upon the lower edge of the bandage, press it firmly against the limb to prevent slipping, loosen the roller considerably in the right hand, at the same time turning it one-half turn toward the operator. This process is to be repeat-

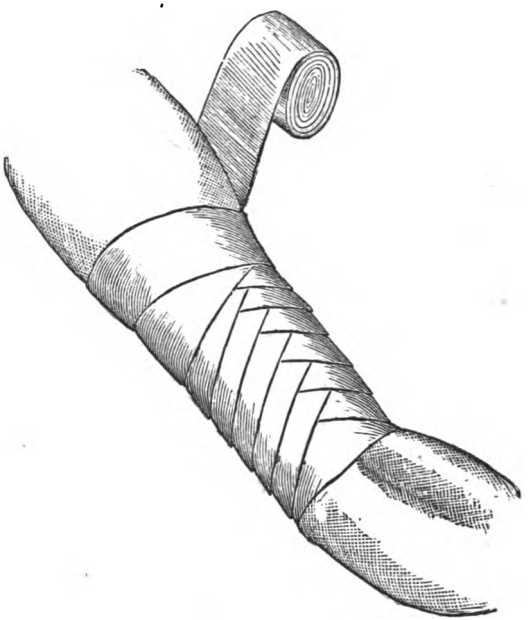

FIG. 3.—The figure-of-8 method.

ed as often as necessary, keeping the reverses well upon the outer border and anterior aspect of the extremity.

The *figure-of-8 turn.* After securing the bandage as heretofore described, ascend the limb sharply, from the inner to the outer border, so that at this outer border

of the limb, the lower edge of the roller shall be two or three inches above the starting-point. Then carry the roller directly across and *behind* the limb to the same point on the opposite side; then obliquely downward in front, crossing the ascending turn at a right angle. When the outer border of the limb is again reached, carry the roller behind the extremity, directly across the limb, to the starting-point. (See Fig. 3.)

The figure-of-8 method will be found to be the most easily and gracefully applied, and the most generally useful, although the other methods may often be used to advantage.

In applying bandages under any conditions, the greatest care must be taken to avoid a greater pressure by one turn of the roller than by another.

Disastrous results may occur from such interference with the venous circulation. Under all circumstances, the bandaging should begin at the extremity and carried toward the centre. If the patient be not under the influence of an anæsthetic, he should be consulted as to whether the bandage was too tight for comfort or not. If he is unconscious, the operator must rely upon his own skill and judgment.

To Bandage the Hand.—(Fig. 4.)

Take a roller between three-fourths and one inch in width, and twelve yards in length. Let the hand to be bandaged be pronated, and commence by taking two or three turns of the roller around the carpus, going from the radial over the back of the wrist to the ulnar side. Having in this manner secured the roller, carry it from the radial side of the wrist obliquely across the dorsum

of the hand to the ulnar border of the root of the little finger, then spirally around the little-finger two turns to its extremity. Next, return by careful spiral turns to the root of the finger, covering it equally and nicely.

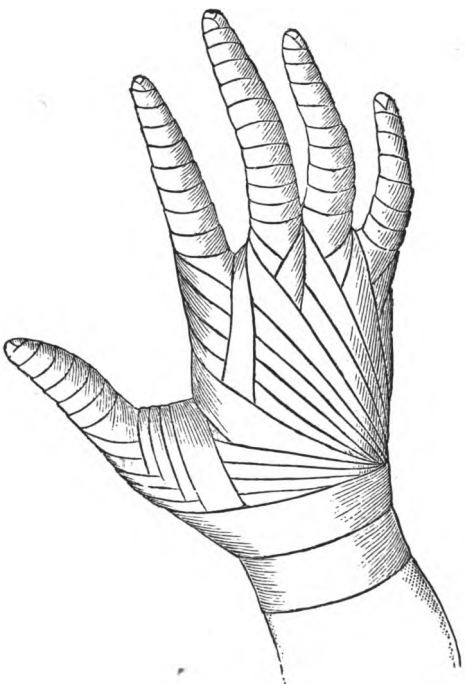

FIG. 4.—Hand, thumb, and finger bandage.—The author's modification of the old method.

From the radial border of the base of the finger the bandage is carried over the back of the hand to the ulnar side of the carpus, then under the wrist, by the front, to the radial side, and again over the dorsum of the

hand around to the ulnar side of the same finger, repeating the figure-of-8, as before. Two turns are then thrown around the wrist to secure the former bandage, and the roller is carried in the same manner to the remaining fingers.

When the index finger is reached, on account of the great space between its root and the thumb, it is advisable to make four or five extra figure-of-8 turns around its base, carrying the bandage a little lower with each successive layer toward the base of the thumb.

Having reached the thumb, the roller is carried spirally to its extremity, as in the other fingers, but in returning, when the last joint of the thumb is reached, the figure-of-8 turn is commenced at this point and continued until the ball of the thumb is completely covered.

To Bandage the Arm and Shoulder.—(Fig. 5.)

Take a roller two and a half inches wide, and of the usual length (twelve yards), fill the palm of the hand (that remained uncovered by the finger bandage) with cotton batting, and lay the end of the roller parallel with a line drawn from the styloid process of the radius to the metacarpo-phalangeal articulation of the thumb. Then carry the roller obliquely across the dorsum of the hand to the ulnar side of the base of the little finger, then directly across the palm to the space between the thumb and index finger, next obliquely across the back of the hand to the ulnar side of the wrist, then across the wrist to the starting-point. Repeat this figure-of-8 turn two or three times, gradually ascending toward the wrist.

Put the limb in the proper position, *i.e.*, with the forearm flexed at right angles to the humerus, and folded

toward the front of the body, with the thumb up,* and bandage the limb by either of the three methods heretofore explained, which may suit the shape of the arm or the taste of the surgeon.

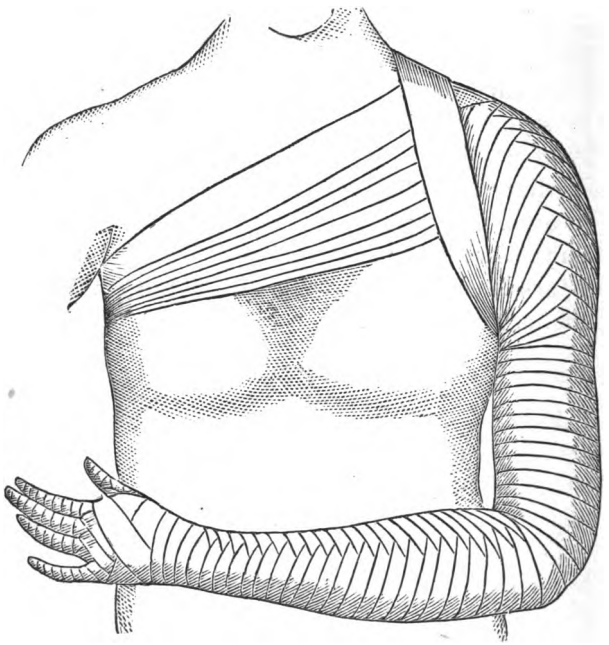

FIG. 5.—Plaster-of-Paris dressing in fracture of the humerus.

When the axilla is reached, the roller is carried from the inner side by the front, over the point of the shoulder, around the back, and underneath the opposite arm, across the chest to the anterior and outer surface

* This position is not allowable in fracture of the olecranon process of ulna, which will be explained further on.

of the humerus, then underneath the arm, making a figure-of-8 turn, one loop of which surrounds the arm, and the other the thorax. These turns are continued, gradually ascending until the root of the neck is reached. It is best to fill the axilla of both arms with cotton batting to prevent chafing, when this dressing is to be worn for any length of time.

To Bandage the Toes, Foot, Leg, and Thigh.

The toes are bandaged in the same manner as the fingers, except that the great toe is covered by the simple spiral turns, as are the four lesser toes. The starting-point is the root of the great toe, going from that point across the top of the foot to the fibular side of the root of the little toe, and then as with the fingers.

The toe bandage may be dispensed with by placing cotton batting between and around these members, and extending the foot bandage well out over them to hold the batting in position.

The Foot.—(Fig. 6.)

The author's method is the only one known to him by which the foot and heel are covered completely by a single roller, without covering first the foot and then the heel, or *vice versa*.

Take a roller of the usual width, from six to eight yards in length. Lay the end of the bandage parallel with the axis of the leg, half-way between the two malleoli in front, and carry the roller by the inner side to the heel, so that the middle of the bandage will be over the centre of the heel's convexity, and on to the starting-

point. Repeat this turn to secure the roller. Next, make another turn around the ankle, carrying the posterior edge of the bandage over the centre of the turn

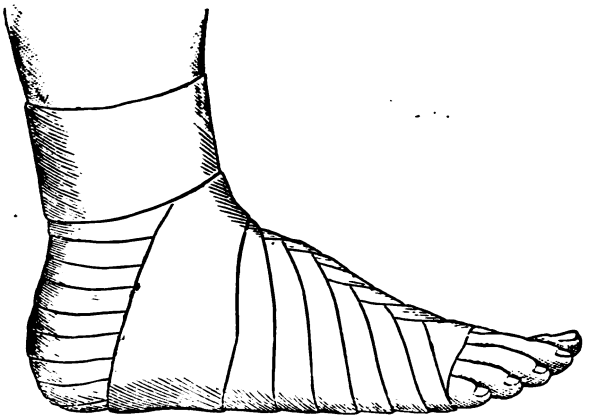

FIG. 6.—The author's single bandage for the heel and foot.

that has just preceded it, and make one or two other turns in front of this until the heel is completely covered.

The bandage is then carried around the heel in the same direction, so that its anterior border rests on the middle of the *first* turn, and the roller is carried from the fibular side of the heel across the dorsum of the foot to the tibial side of the great toe. It then travels under the bases of the toes to the little toe, making a couple of complete turns around the foot at this point, and when the roller has again reached the fibular side of the little toe, it is made to cross obliquely the dorsum of the foot to the tibial side of the heel, keeping the lower edge of the bandage about a quarter of an inch

above the bottom of the heel. Repeat this figure-of-8 turn, gradually climbing up the foot until the entire foot is thoroughly concealed. It is best to cut with the scissors each turn of the roller about half through just when it crosses the front of the ankle, so that the accumulation of the bandage at this point may not interfere with the movements of the ankle-joint.

The crossings of the figures-of-8 turns on the dorsum of the foot should be kept a little to the fibular side of the median line.

To Bandage the Leg and Thigh—(Fig. 7.)

Carry the roller two turns around the leg, just above the ankle, slightly overlapping the upper portion of the foot bandage, beginning on the inner side and going by the front to the outer side. Then cover the entire limb by either of the three methods heretofore explained (the figure-of-8 being the quickest method), until the bandage touches the perineum.

Upon reaching this point carry the roller outward and upward, just above the great trochanter, then around the back to the upper border of the opposite ilium, obliquely downward across the abdomen to the front and outer side of the thigh, and then behind the thigh to the starting-point.

This is to be repeated, at the same time ascending the limb until the hip is covered. A few turns around the abdomen, just above the iliac crests, will complete this dressing.

It will be observed that this figure-of-8 turn around the thigh and pelvis, if used alone, will constitute the

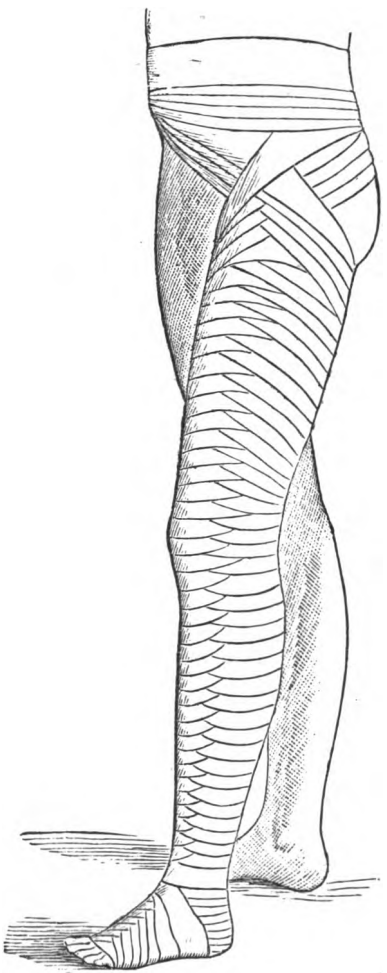

FIG. 7.—Bandage for the lower extremity, applicable under all circumstances—especially useful in plaster-of-Paris dressings in fracture of leg and thigh.

spica bandage used in retaining dressings to the inguinal and femoral regions.

To Bandage the Head.

For retaining ice caps, or other dressings to the head, the hood bandage will be found most convenient, while its modifications will suffice to keep a dressing upon any limited portion of the scalp.

(Fig. 8.) To apply this, take a roller twelve yards long, and two and a half inches in width, rolled from both ends to the centre. Holding one head

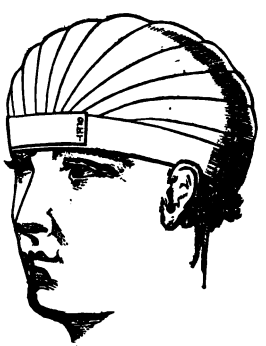

FIG. 8.—The hood bandage, for retaining dressings to all portions of the scalp.

of the roller in each hand, the surgeon standing behind the patient, and laying the middle of the bandage across the forehead just over the eyebrows, carries one head in the right and the other in the left hand around the head, above the ears, and crosses them under the occiput, so that the roller which went to the rear in the left hand will travel again to the front over the

same path. The roller in the right hand is then carried over the head, in the median line, from the occiput to the nose, and at this point it is caught and held down by the encircling turn carried in the left hand. Then carry the roller which came over the median line of the head back again to the rear, so that its right edge will rest on the middle of the first turn. It is again caught under the encircling turn at the occiput, is carried to the front on the opposite side, and continues to travel from before backward in an ellipse that is constantly increasing until it blends with the encircling turn upon the sides of the head. Each successive turn of the elliptic should leave about one-third of the turn that preceded it uncovered in the centre. Of course the ends will meet at the same point, before and behind, where the reverses are made.

The Knotted Bandage—(Fig. 9)

Is useful to arrest hemorrhage from wounds of the temporal and other arteries of the scalp.

FIG. 9.—The knotted bandage for compression in wounds of temporal or other vessels of scalp.

Take a piece of cork or wood, about an inch in diameter, and one-quarter of an inch in thickness, and wrap it with lint to make a compress. Apply this to the bleeding point, and lay over it the centre of a double-headed roller, carrying the turns around the head, above the ears. They are then crossed over the compress, one end is carried under the chin, the other over the top of the head, and they are again crossed on the opposite temple. Having carried the rollers again around the head and crossed them firmly over the compress, the ends are pinned securely and cut off. A horizontal slip may then be pinned to the anterior, middle, and posterior slips of the knotted bandage, beginning in the median line on the forehead, then back to the centre of the middle slip, and then to the slip underneath the occiput, to prevent any possibility of slipping.

How to Apply Plaster-of-Paris Dressings.

To prepare bandages for plaster dressings, first sift the plaster very carefully, to remove lumps and particles of trash, and as the bandage is being rolled rub the plaster well into the meshes of the cloth, until its texture is covered. It is only necessary to rub the plaster upon one side of the roller, and that must be the side that is being turned in as the bandage is rolled.

A few minutes before they are to be applied the bandages are placed into a basin of warm salt water, and left until the bubbles of air cease rising to the surface. They are then completely saturated, and must be taken out, squeezed as dry as possible, and applied immediately, as heretofore described.

A half-pint of salt to two gallons of water is about the proper quantity.

Plaster that has deteriorated by exposure can be rendered anhydrous by heating in a closed oven.

The manner of covering the limb before applying this dressing will be explained hereafter.

Plaster Dressings in Fractures of the Humerus.

Bandage the hand and forearm, and by the proper extension and counter-extension adjust the fragments.

The operator now puts a dry roller, free from plaster, around the humerus and shoulder by figure-of-8 turns, extending this as far as it will be necessary to use the fixed dressing. A thin undershirt can be used for this first covering just as well, its function being only to prevent the plaster from getting next to the skin, where the hairs of the limb would become entangled in it as it "set," rendering its ultimate removal unnecessarily painful.

The forearm is bent at right angles to the humerus, the fractured ends held in apposition by an assistant, and the prepared rollers are applied from the wrist up to the neck as in figure (5).

It is best to apply about nine thicknesses of bandage (equal to three rollers) to the injured limb, while for six inches above and below the point of fracture double this amount is required. If for any reason there is a scarcity of plaster or bandages, a lighter dressing may be made strong by laying strips of zinc, copper, or tin, cut about one inch in width and one foot in length, parallel with the axis of the limb, and working these in with the plaster throughout the entire circumference of

the extremity. The centre of the strips should be opposite the point of fracture. It is generally advisable after each separate bandage is applied to cover it with dry plaster, which is then moistened by the hands and moulded to the limb. If the fracture is near the lower extremity of the humerus it will suffice to carry the plaster dressing to the axilla, but if the upper half, or neck, is broken, the dressing must go over the shoulder to the root of the neck.

Plaster Dressings for the Leg and Thigh.

The most easily managed and simply constructed apparatus for making the necessary extension and counter-extension, in fractures of the lower extremity, is made as follows:

Into each end of a table, about five feet long, two holes are bored, and into these, two perpendicular pieces are fitted, two feet long and about two inches in diameter, while a strong horizontal bar connects the two upper ends. One of these uprights is smoothed, rounded, and padded, to prevent injury to the perineum.

The foot of the injured side being nicely bandaged (as in Fig. 6), the patient is placed upon the table, astride the padded upright (see Fig. 10), and with the perineum against it, and is suspended by a strap passed over the horizontal bar and underneath the sacrum, being elevated from the table sufficiently to allow free manipulation of the bandages under the back. The head and shoulders are supported upon pillows, the foot of the uninjured limb rests upon a stool, a clove hitch or double loop is thrown around the ankle, and to this a block and pulley is attached, the opposite end of which

is fastened to the wall. Extension is then applied, until by measurement from the anterior superior spinous process of the ilium to the lowest point of the inner malleolus, the two legs are found to be of exactly the same length. The leg and thigh is then covered with a dry roller, or a trousers' leg, or piece of soft blanket, and the plaster rollers are applied as described in the dressings for fracture of the humerus. Accessory splints of zinc, copper, tin, or hoop-iron may be worked in, in the same

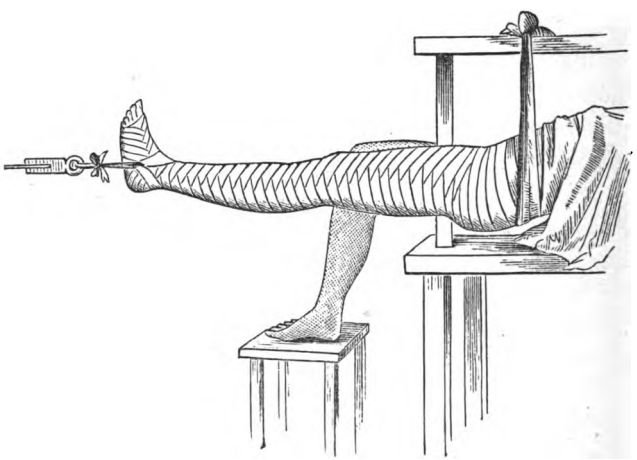

FIG. 10.—Extension and counter-extension apparatus, for applying plaster-of-Paris dressings in fractures of the lower extremities.

manner as there described, only they should be cut longer for the leg. When the fracture is near the neck of the femur, these strips must extend well up on the abdomen.

When the bone is broken near the condyles, the plas-

ter rollers need be carried no higher than the perineum.

This same apparatus, so simple that any man of ordinary intelligence and mechanical ingenuity can, with the proper wood, a hatchet, saw, and auger prepare it in half an hour, is all that is required to put up a fracture of the lower extremity, be that fracture anywhere between the ankle and the hip-joint.

In fractures of the tibia or fibula, or of both bones near the ankle, the dressing need not be carried higher than the knee; while if in the upper part of these bones the rollers must be carried to the perineum. In case of compound fracture, a fenestrum can be cut over the point of injury.

The patient should be guarded against carelessly allowing any urine to become infiltrated beneath the dressing, as such an accident will contribute greatly to his or her annoyance.

When it becomes necessary to remove the plaster, it is opened on one side with an ordinary shoe-knife, and then pulled off.

It is usually advised in works on surgery to put the patient under the influence of an anæsthetic, so as to completely relax the muscles of the fractured limb.

With all due deference to these older gentlemen, the author is decidedly of the opinion that it is not essential to the success of the operation.*

* In January, 1875, my friend Dr. L. M. Yale, Surgeon to the Charity Hospital, New York, and I dressed a fracture of the femur near the trochanter, by the above method without the use of any anæsthetic. The patient was very muscular, weighing 180 lbs., and suffered so little during the operation, that he smiled and made jocose

If after the extension is complete the limbs are of the same length, anæsthesia is believed to be unnecessary. The opinion of the patient as to the amount of pressure most comfortable to the limb is of no little value to the surgeon.

The author has had constructed the apparatus shown in the annexed cut (Fig. 11), which is not costly, is easily

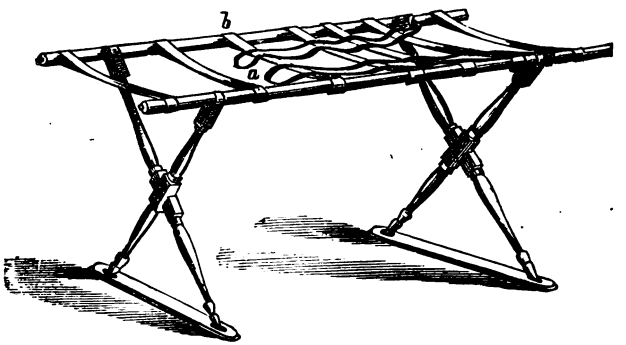

FIG. 11.—The author's apparatus for extension and counter-extension, in treating fractures of the leg and thigh with plaster-of-Paris dressings.

(*a*) Leather straps which pass under the perineum and over each thigh.

(*b*) Webbing strap upon which the sacrum rests. This strap is unkeyed and drawn from underneath the dressing when it is completed, as are the leather straps marked (*a*).

made, and can be done up in a very convenient package for transportation (see Fig. 12).

remarks throughout the séance. He recovered completely in three weeks, was not confined to bed more than ten days, and has by the closest measurements only three-sixteenths of an inch shortening. I have seen and assisted also in dressing fracture of the humerus without anæsthesia.

It consists of two poles of ash or hickory, five and a half feet long, and two inches in diameter, turned perfectly round and smooth.

FIG. 12.—The same, ready for transportation.

These are supported by two legs at each end, each leg being made of the same strong material, forty-one inches long, and having a strong piece of iron curved over its upper end, and fastened on each side, forming a loop or eye, through which the parallel bars fit snugly. The lower ends are smaller, somewhat pointed, and fit into a hole in a cross-piece, extending between the two legs of one end, to prevent spreading. Where the legs cross in the centre they are mortised, so as to fit into each other, and have an iron screw-bolt running through them at this point to fasten them firmly together.

This bolt should be left long enough, so that the nut, when loosened, will allow the legs to be freed from the mortises, and fold up, like a pair of scissors, into a small space for convenience of packing.

The legs in position are spread until they leave the parallel bars twenty-two inches apart, from inside to inside, and thirty-two inches from the ground.

A series of webbing-straps, eight in number, two inches in width, with a sewed loop at one end and a buckle loop at the other, are fastened on the poles at proper distances. The body of the patient rests upon these, and they can be slid up or down, tightened or

loosened by the buckle-strap to suit the convenience of the operator.

The one of these straps upon which the sacrum of the patient rests must be well removed from the others, and differs from the rest in not having the sewed loop at the end, but instead a loop made by passing a strong iron spike through eyelets worked in the proper places, so that the spike can be withdrawn and the strap pulled from under the plaster dressings, which have overlapped it, as the roller travels from the thigh around the sacrum to the front of the abdomen. The counter-extension is made by means of two long perineal straps passing from the iron loop, on each side of the patient's head, around the perineum, and back, to be fastened at the starting-point. To prevent the litter from slipping when the extension is applied, a strong cord should be fastened between the end nearest the patient's head and the adjacent wall.

The counter-extension is made from two iron hooks, in the soles of a pair of skeleton shoes (Fig. 13), which

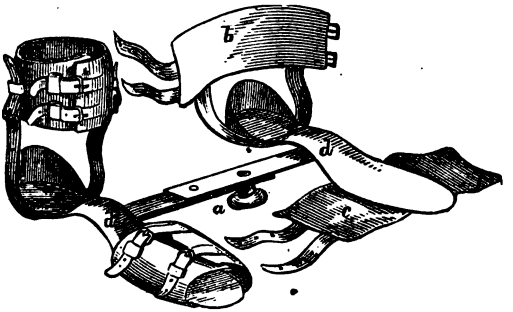

FIG. 13.—The author's extension shoes: modification of those in use at Bellevue Hospital.

are strapped to the patient's feet, and can be approximated or separated by means of an adjustable bolt passing between them.

After the dressing is complete, the patient rests in

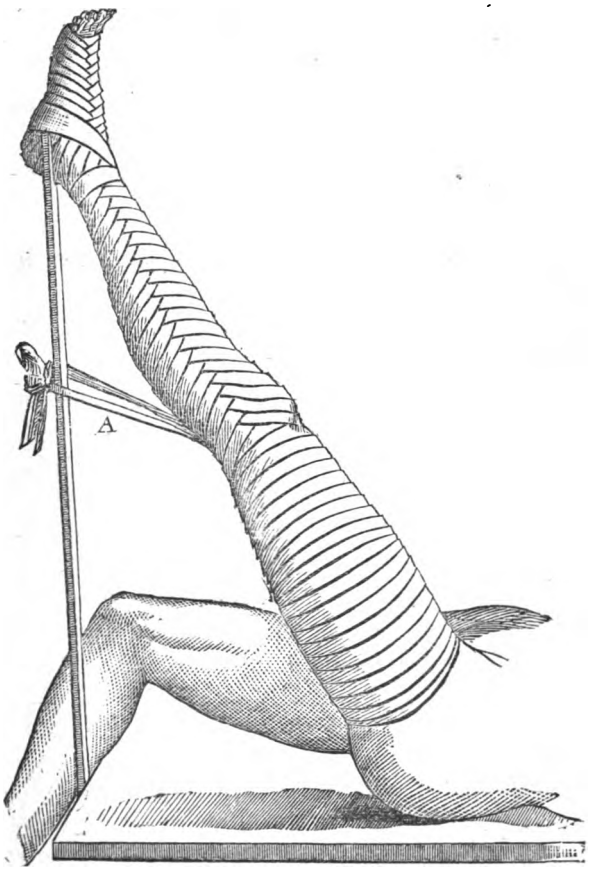

FIG. 14.—The author's method of dressing fracture of the patella by the fixed (plaster-of-Paris) method.

perfect comfort and safety upon this litter, until the plaster is completely solidified.

The use of this apparatus avoids all danger to the patient from accidental slipping or breaking of the extension or counter-extension fixtures, the parts being perfectly supported by the webbing straps; it is not painful, since the weight of the body is distributed over such an extensive surface and is not confined to a single loop of wire or bandage, as was formerly used; and it can be strapped into such a small package that it is transported without inconvenience.

Fracture of the Patella by the Plaster Method.

The author's method of dressing fracture of the patella by the fixed apparatus is as follows (see Fig. 14):

Having bandaged the foot of the injured limb, the patient is laid upon a table, with the leg elevated at almost a right angle to the plane of the body, and the heel is placed in a notch cut in the end of an upright, which is nailed to the table. This position relaxes the *rectus femoris* muscle, and allows the upper fragment to be brought in contact with the lower one.

A piece of adhesive plaster (moleskin is best) is then cut as represented in Fig. 15. It should be cut wide enough to lap over the anterior half of the thigh, and about eighteen to twenty inches in length. Apply this to the limb so that one of the three tails shall fall on each side of the upper fragment, and one over its centre. Throw a few turns of a roller around the plaster above the patella to aid in holding it in position, make the necessary traction, and when the two fragments touch, secure the plaster to the leg below by an

additional roller. A dry roller or other covering is then applied, and the plaster rollers are adjusted as high as the perineum.

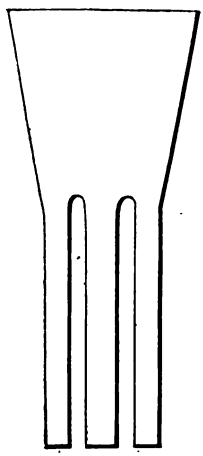

FIG. 15.—Adhesive strip for retaining fragments in position.

In half an hour the leg can be taken down, and the patient is at liberty to go where he chooses. There is no necessity for his remaining in bed for weeks in a fixed position, with nothing else to do but brood over his own misfortunes.

If the moleskin plaster is not available, the surgeon can use a roller bandage, about three inches wide, as follows: Lay the centre of the double-headed roller just over the upper border of the upper fragment, carry it under the leg, and tie in a loose *single* knot. The two ends are then carried around the upright piece, caught in a couple of notches cut in it, and when the fragments are approximated by the extension and

manipulation, the roller is tied securely to prevent slipping.

The plaster-of-Paris bandages are then applied as before, and when they "set" the extension roller is cut, untied, and slipped from underneath the plaster-cast. This roller extension is represented in Fig. 14.

The superiority of plaster-of-Paris dressings in the treatment of fractures, more especially those of the lower extremities, consists in its extreme cleanliness; it renders the limb perfectly fixed, so that no accidental movement during sleep, or awake, can interfere with perfect and successful union, and, above all, it allows the patient to go about upon his crutches, avoids the bed-sores of the older methods, and gives him, what is better than all medical treatment, mental diversion and partial forgetfulness of his unhappy condition.

That it has, in rare instances, given unfortunate results, is not an atom of weight in argument against it, since it cannot prove unsuccessful in the hands of the careful surgeon—the surgeon who has been wise enough to perfect himself in the *little things* of minor surgery, and who has learned that it is these little things in life that in the end sum up the full result, success.